Adverse Reaction Workup Categories and Testing Protocols
Job Aid for Transfusion Service/Laboratory

Pre-transfusion Testing Categories for Saskatchewan Facilities	
Transfuse Only Facility	• No red blood cells held on site • No pre-transfusion testing performed on site • Transfuses crossmatched blood supplied by other facility
Hold Blood Laboratory	• Holds O negative, Kell negative, uncrossmatched red blood cells for transfusion in emergent situations • No pre-transfusion testing performed on site • Transfuses crossmatched blood supplied by other facility
Basic Testing Transfusion Laboratory	• Basic pre-transfusion testing includes: Direct Antiglobulin Test, Group and Screen and crossmatching when no significant antibodies are detected
Advanced Testing Transfusion Laboratory	• Pre-transfusion testing included: All testing performed at the Basic Testing laboratories, as well as basic antibody identification, antigen typing and crossmatching • Advanced Testing laboratories require at least two commercial manufactured antibody panels to complete basic antibody identification
Complex Testing Transfusion Laboratory	• Full range of pre- and post-transfusion testing provided • Performs complex testing to determine basic and complex antibody identification • Complex testing laboratories require multiple commercially manufactured antibody panels and anti-sera to identify and exclude antibodies

CATEGORY OF WORKUP	CONDITION(S)	PROTOCOL

LEVEL 1 SEROLOGICAL INVESTIGATION	• If a transfusion reaction is reported to the transfusion service/laboratory	• Request ward to send the following to the transfusion service/laboratory:
		  ○ patient's post-transfusion sample (2 EDTA vials)
		  ○ component bag or product container with the administration set/fluid
		  ○ component/product compatibility tag
		• **Complete Level 1 Serological Investigation as follows:**
		  ○ Lab clerical check of the:
		  ▪ component bag or product container
		  ▪ component/product compatibility tag
		  ▪ patient's pre- and post-transfusion samples
		  ▪ relevant records
		  ○ Visual plasma check on post-transfusion EDTA sample for hemolysis (slightly red to dark red or hemolyzed) or bilirubin (icteric, green, brown)
		  ○ Polyspecific DAT on the post-transfusion sample
		  ○ ABO/Rh on the post-transfusion sample
		• *If the transfusing facility is unable to perform any of the above testing, send required samples to the crossmatching facility*

	• If the results of the clerical check are incorrect or not identical	• Collect a new post-transfusion sample to confirm discrepant results • Search current files to determine if another patient is at risk
	• If the visual plasma check is positive	• Collect a new post-transfusion sample and repeat visual inspection of plasma • Visually inspect the donor unit(s) and segments for hemolysis, clots, purple color, etc. (refer to CBS Visual Assessment Guide available at https://professionaleducation.blood.ca/sites/msi/files/VAG_en.pdf)

		• Contact the SK TM Consultant immediately if there is evidence of a hemolytic transfusion reaction
		• A hemolysis work-up should be requested, including:
		  o Urinalysis on post-transfusion first voided urine
		  o CBC, direct and total bilirubin, reticulocyte count, haptoglobin, peripheral blood smear, urea, creatinine, electrolytes
		  o Consideration should be given to a PTT, INR and fibrinogen

	• If the post-transfusion DAT result is positive	• Complete a polyspecific DAT on the pre-transfusion sample
		  o If the pre-transfusion DAT result is negative or at a weaker strength than the post-transfusion DAT result:
		  ▪ Review the patient's transfusion history record to see if possible passive antibodies were acquired from transfusion
		  ▪ Contact the SK Transfusion Medicine Consultant if transfusion history indicates possible passive antibody
		  ▪ Send the pre- and post-transfusion samples to a complex site for differential testing
		  o If the pre-transfusion DAT result is positive at the same strength or greater than the post-transfusion DAT result, no further investigation is required

LEVEL 2 SEROLOCIAL INVESTIGATION	• If any of the results of the Level 1 Serological Investigation are positive or abnormal	• Contact the SK Transfusion Medicine Consultant to inform them of the need for a Level 2 Serological Investigation and verbally report and review the results of testing
		• **Complete Level 2 Serological Investigation as follows:**
		  o ABO/Rh on pre-transfusion sample <u>and</u> implicated donor unit(s)
		  o Antibody screen on pre- and post-transfusion samples
		  o IAT crossmatch of implicated donor unit(s) using pre- and post-transfusion samples

	• If a discrepancy is identified on repeat ABO/Rh testing of donor unit(s)	• Report to CBS and Health Canada immediately
	• If a discrepancy is identified on repeat ABO/Rh testing of the patient pre-transfusion sample compared with the post-transfusion result	• Report to SK Transfusion Medicine Consultant immediately • Stop all ongoing RBC transfusions and hold all pending RBC transfusions until it is confirmed that another patient is not at risk due to sample mix-up ("wrong blood in tube")

	• If IAT crossmatch identifies an incompatibility	• Refer pre- and post-transfusion samples to a complex testing site for further investigation
		• A hemolysis work-up should be requested, including:
		  o Urinalysis on post-transfusion first voided urine
		  o CBC, direct and total bilirubin, reticulocyte count, haptoglobin, peripheral blood smear, urea, creatinine, electrolytes
		  o Consideration should be given to a PTT, INR and fibrinogen

	• If antibody screen on the post-transfusion sample is positive, suggestive of a new antibody	• Refer to a complex testing site for antibody identification, including the following:
		  o Pre-and post-transfusion samples
		  o Available segments of any units transfused within the previous 3 months

BACTERIAL CONTAMINATION OR SEPSIS	• If the component/product appears to be contaminated with bacteria in visual inspection; <u>or</u> • If the patient has any ONE of the following signs or	• Send the returned blood component (NOT the segment) or plasma protein product to the transfusion service/laboratory for aerobic and anaerobic blood cultures and gram stain.

	symptoms, or bacterial contamination or sepsis is suspected: ○ Temp rise ≥ 1°C from baseline and ≥ 38°C PLUS any of the following signs or symptoms: • Rigors • Hypotension • Shock • Tachycardia • Dyspnea • Nausea/vomiting **OR** ○ Temp rise ≥ 1°C from baseline and ≥ 39°C with or without other signs or symptoms **OR** ○ Temp rise not responding to antipyretics **OR** ○ Clinical staff are suspicious of bacterial contamination or sepsis even in the absence of fever	• Collect aerobic and anaerobic blood cultures on the patient (taken from different sites) • Report to CBS or Product Manufacturer and Health Canada as soon as bacterial contamination is suspected, based on component or product appearance, patient clinical condition, or preliminary bacterial culture results.
TRALI	• If the patient's condition meets the following definition of Acute Lung Injury (ALI): ○ New ALI is present ▪ Acute onset ▪ Hypoxemia – PaO_2 / FiO_2 < 300 **OR** – Oxygen saturation is < 90% on room air **OR** – Other clinical evidence ▪ Bilateral lung infiltrates on frontal chest X-ray ▪ No evidence of circulatory overload • In patients with no evidence of ALI prior to transfusion, TRALI is diagnosed if: ○ New ALI is present ○ It occurs during, or within 6 hours of completion of transfusion ○ There are no other risk factors for ALI	• Contact the SK Transfusion Medicine Consultant • Subsequent investigations should include: ○ Chest X-ray ○ Arterial blood gas ○ Referral of the post-transfusion EDTA sample to CBS Winnipeg Centre for donor HNA and HLA antibody testing • Immediately report to CBS or Product Manufacturer and Health Canada
SEVERE ALLERGIC OR ANAPHYLACTIC REACTION	• If the patient experiences respiratory signs/symptoms of airway compromise or severe hypotension requiring vasopressor treatment in addition to mucocutaneous signs/symptoms. ○ *The respiratory signs/symptoms may be laryngeal (tightness in the throat, dysphagia, dysphoria, hoarseness, strider) or pulmonary (dyspnea, cough, wheezing/bronchospasm, hypoxemia)* **OR**	• Contact the SK Transfusion Medicine Consultant • Subsequent investigations may include: ○ Serum Haptoglobin level ○ Serum IgA level ▪ If the serum IgA is <0.06 g/L, consideration will be given to anti-IgA testing ○ Referral of the pre-transfusion EDTA sample to the CBS Ottawa Reference Laboratory, National Immunohematology Reference Laboratory (NIRL) for further testing to rule out an anti-Chido or anti-Rogers, if a non-specific

	• If the patient experiences, in addition to the above mentioned, profound hypotension with loss of consciousness, circulatory collapse or death	antibody is detected on antibody screen • Immediately report to CBS or Product Manufacturer and Health Canada